



**International
Standard**

ISO 8980-4

**Ophthalmic optics — Uncut finished
spectacle lenses —**

**Part 4:
Specifications and test methods
for the properties of anti-reflective
coatings and hydrophobic coatings**

Optique ophtalmique — Verres de lunettes finis non détournés — [get full document from standards.iteh.ai](https://standards.iteh.ai)

*Partie 4: Spécifications et méthodes d'essai relatives aux
propriétés des traitements antireflet et hydrophobes*

**Third edition
2026-06**

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 7, *Ophthalmic optics and instruments*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 170, *Ophthalmic optics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 8980-4:2006), which has been technically revised.

The main changes are as follows:

- the title has been updated;
- the scope has been expanded to include properties of hydrophobic coatings;
- the scope has been defined to exclude requirements and test methods found in other standards within the ISO 8980 series;
- normative references, terms and definitions relating to hydrophobic properties have been added in [Clause 2](#) and [3](#);
- test methods for properties of hydrophobic coatings have been added in [Clause 5](#) and informative and normative [Annexes C](#), [D](#) and [E](#).

A list of all parts in the ISO 8980 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Ophthalmic optics — Uncut finished spectacle lenses —

Part 4:

Specifications and test methods for the properties of anti-reflective coatings and hydrophobic coatings

1 Scope

This document specifies optical and non-optical requirements and the test methods for anti-reflective and hydrophobic properties of coatings on spectacle lenses.

This document does not apply to the following topics:

- requirements and test methods incorporated in other ISO 8980 series standards;
- the colour of the reflected light.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 48-2, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 2: Hardness between 10 IRHD and 100 IRHD*

ISO 8980-1, *Ophthalmic optics — Uncut finished spectacle lenses — Part 1: Specifications for single-vision and multifocal lenses*

ISO 8980-2, *Ophthalmic optics — Uncut finished spectacle lenses — Part 2: Specifications for power-variation lenses*

ISO 8980-3, *Ophthalmic optics — Uncut finished spectacle lenses — Part 3: Transmittance specifications and test methods*

ISO 13666:2019, *Ophthalmic optics — Spectacle lenses — Vocabulary*

ISO 14889, *Ophthalmic optics — Spectacle lenses — Fundamental requirements for uncut finished lenses*

3 Terms and definitions

For the purposes of this document, the following terms and definitions given in ISO 13666 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 durability

<anti-reflective coating> ability to resist deterioration of its reflectance characteristics, over time, in intended use

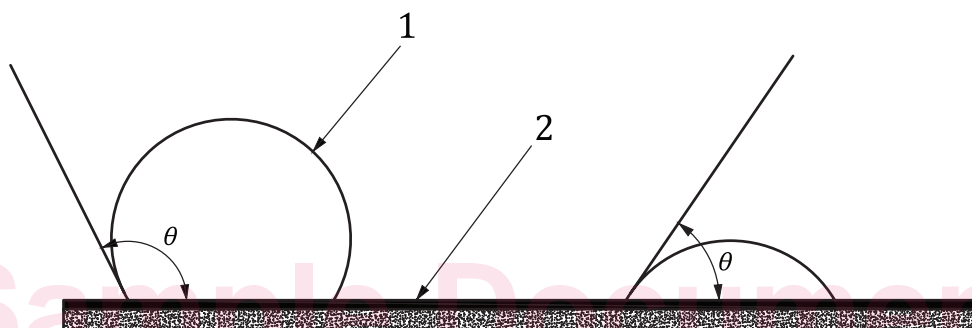
Note 1 to entry: The major factors contributing to deterioration of an anti-reflective coating are rubbing, heat, UV radiation and humidity.

Note 2 to entry: The main failure affecting the durability of anti-reflective properties is a loss of adhesion. Therefore, requirements of this document are related to anti-reflective coating adhesion.

3.2 static contact angle

θ
angle in the vertical plane between the solid surface of the specimen and the tangent to the surface of a droplet of liquid resting on the surface at the interface of air, liquid and the substrate under normal air conditions

Note 1 to entry: The static contact angle is illustrated in [Figure 1](#).



Key

- 1 surface of the droplet of liquid
- 2 surface of the lens

Figure 1 — Illustration of contact angle

3.3 hydrophobic coating

coating on the top of the lens surface or surface coating layers having water repellent properties

Note 1 to entry: A number of trade names, such as self-cleaning, hydrophobic, water repellent, waterproof are applied to this type of coating.

Note 2 to entry: It is generally considered that a hydrophobic surface has a static water contact angle that is greater than or equal to 90°.

Note 3 to entry: Hydrophobic coatings are frequently used to provide anti-fouling properties, i.e. ease of cleaning

4 Requirements

4.1 General requirements

Anti-reflective coated and hydrophobic coated lenses shall comply with the general requirements concerning the finished spectacle lens specifications in ISO 8980-1, ISO 8980-3 and ISO 14889. This document applies to lenses that are antireflective coated or hydrophobic coated, or a combination of both.

NOTE 1 For further information on the properties of anti-reflective coatings, see [Annex A](#).

NOTE 2 The reflectance characteristics of an anti-reflective coating should not significantly change due to deterioration of the coating in intended use.

4.2 Usable diameter of coated area

The usable diameter of the coated area for uncut finished spectacle lenses shall be $\geq(d_n-4)$ mm, where d_n is the nominal diameter of the lens, in millimetres, indicated by the manufacturer.

4.3 Luminous and mean reflectances

The luminous reflectance, ρ_V , and the mean reflectance, ρ_M , of an anti-reflective coated lens shall be determined by the method specified in [5.2.2](#).

If the manufacturer specifies values for luminous and mean reflectances, the measured values shall not exceed the specified values by more than 20 %.

When determined as described in [5.2.3](#), the luminous reflectance, ρ_V , of any anti-reflective coated lens surface shall be less than 2,5 %.

4.4 Water repellency

The static contact angle of water for the front surface of a lens with hydrophobic coating shall be determined by the method specified in [5.3](#).

For lenses for which the hydrophobic property is claimed, the mean static contact angle of water shall be greater than or equal to 90°.

4.5 Durability

Under the conditions described in the test method given in [5.4](#), five consecutively tested lenses shall be free of significant loss of adhesion as defined in [5.4.4](#).

A product meets the durability requirements of this document if all five lenses tested satisfy this criterion.

5 Testing

5.1 General

This clause specifies type test methods for anti-reflective and hydrophobic coatings on spectacle lenses. At least 24 h shall elapse after coating before any type test is carried out. Lenses shall be stored at a temperature of 20 °C to 26 °C.

5.2 Anti-reflective coating

5.2.1 Method of determination of spectral reflectance

5.2.1.1 Apparatus

Use any dual-beam or single-beam spectrophotometer with an incident angle not larger than 17° and with a measurement accuracy sufficient to give the value of the spectral reflectance at all wavelengths, λ , between 380 nm and 780 nm with an uncertainty of less than 0,1 % (for example an anti-reflective coating quoted as having 0,5 % reflectance may be measured as having 0,4 % to 0,6 % reflectance). The wavelength increment of measurement shall not be more than 5 nm. The spectral bandwidth (full width at half maximum, FWHM) shall not exceed 5 nm.

The calibration specimen shall have a surface curvature within 0,50 D of that of the spectacle lens to be tested. The back surface of this specimen shall be designed such that unwanted reflections will be minimized (e.g. both frosted and painted matt black). The calibration specimen shall be of known refractive index $n(\lambda)$